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REMARKS/ARGUMENTS

Favorable consideration of the above claims is respectfully requested.

Claims 1, 3-22 are canceled in acknowledgement of the Examiner's statement on page 2 of the Office Action of March 20, 2007, that "The requirement is ... deemed proper and is therefore made FINAL." Applicants reserve the right to file divisional applications directed to the inventions in the canceled claims.

In the present amendment, Applicants have amended independent Claim 2 to incorporate more of the inventive features of the present invention of specially engineered particles of cerium oxide that enhance the longevity of living cells by acting as a regenerative free radical scavenger. In addition, Applicants have added new claims 23 – 27. Support for the amendments to Claim 2 and the newly added claims is found in the specification on page 2, lines 4-7; Fig. 3; page 4, lines 18-24; page 5, lines 1-10, 13-15 and page 6, lines 6 – 9.

No new matter is added by the amendments identified above.

Applicants now respond to the detailed action starting with a statement of Applicants' invention, as now claimed: Applicants disclose a novel method for increasing the life-span of living cells comprising: adding non agglomerated, ultra fine, engineered nanoparticles of cerium oxide, with high biological activity as free radical scavengers, to cultures of living cells. The structure and mixed valence states of the cerium oxide particles permits regeneration of the particles once a radical scavenging event has occurred, making them biologically available for multiple rounds of radical scavenging.

Claim Rejections – 35 USC § 103 – On page 3 of the Office Action of March 20, 2007, Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kropf et al. (US

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6,368,577 B1) in view of Shui et al. (*Experimental Eye Research*, December 2000, Vol. 71 (6), pp. 609-618).

The Examiner argues that "Kropf et al. teaches a composition used for blocking the penetration of UV radiation comprising inorganic light-blocking pigments... such as cerium oxide." Applicants' amended Claim 2 is now directed to the discovery of a new property of cerium oxide, that of a regenerative, free-radical scavenger. This property was not known or taught by Kropf alone or in combination with Shui et al. *supra.*

With regard to Shui et al., the Examiner argues that "Shui et al. teaches the morphological observation on cell death and phagocytosis induced by ultraviolet irradiation in cultured human lens epithelial cells." This is arguably the antithesis of Applicants' invention, because Shui et al. teaches that UV irradiation is a cause of cell death (apoptosis and/or necrosis); whereas, Applicants' invention teaches how to keep living cells alive and enhance longevity by preventing free radical induced damage from a variety of sources, such as aging, sunlight (UV irradiation), injury and the like.

Further, the Examiner admits that "Kropf et al. does not teach a method of enhancing the longevity of cultured living cells." Applicants hasten to add that neither do Shui et al. teach a method for enhancing longevity. Shui et al. teach the cause of cell death. We find the Examiner's hindsight arguments untenable that "...it would be obvious to add a known UV protectant ...to help prevent UV from affecting the cell." because the Examiner has assumed that Applicants are using the cerium oxide as a UV protectant, not as a material with a newly discovered property as a *regenerative free-radical scavenger*. There must be a reason apparent at the time the invention was made to the person of ordinary skill in the art

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for applying the teaching at hand, or use of the teaching as evidence of obviousness will entail prohibited hindsight." *In re Nomiya*, 184 USPQ 607 (CCPA, 1975).

Applicants also take exception to the Examiner's conclusory argument on page 4 of the Office Action of March 20, 2007, "...one would be motivated to combine the non-agglomerated ultrafine engineered nanoparticles of cerium oxide to protect the cultured cells from apoptosis or/and necrosis, hence enhancing the longevity." Again there is an impermissible assumption that preventing death is equivalent to prolonging life. There can be an infinite number of methods for preventing death and there can be an infinite number of methods for prolonging life and each methodology can be innovative and distinct.

For example, what about a distinction between internal and external causes of death and the need for methods that prevent the different causes of cell death? What about aging and decline of cell activity prior to death? What about eliminating free radicals that are constantly being formed by a body while it is living? Free radicals are the species formed in the intra-cellular bodies throughout their lifetime and are known to be the main factor in cell aging and death. Applicants have discovered that cerium oxide nanoparticles not only enhance cell longevity by acting as free radical scavengers, but are regenerative and available for multiple rounds of free radical scavenging.

There is no teaching, suggestion or motivation provided by Kropf et al. (US 6,368,577 B1) in view of Shui et al. (*Experimental Eye Research*, December 2000, Vol. 71 (6), pp. 609-618) that cerium oxide nanoparticles would function as regenerative free radical scavengers when added to living cells and enhance the longevity thereof. Accordingly, Applicants respectfully request that the withdrawal of the rejection of Claim 2 under 35

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U.S.C. 103(a) based on the teachings of Kropf et al. (US 6,368,577 B1) in view of Shui et al. (*Experimental Eye Research*, December 2000, Vol. 71 (6), pp. 609-618).

Amended Claim 2 and new claims 23-27 are now pending. The application and claims are believed in condition for allowance in view of the amendments and arguments to overcome the rejection of Claim 2 under 35 U.S.C. 103(a); allowance is respectfully requested.

If the Examiner believes that an interview would be helpful, the Examiner is requested to contact the attorney at the below listed number.

Respectfully submitted,

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